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EXAMINER

FINDLEY, CHRISTOPHER G

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/708,905	Applicant(s) MOHAMED ET AL.	
	Examiner CHRISTOPHER FINDLEY	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 and 29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 and 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Remarks pages 9-10, filed 12/08/2008, with respect to the rejection(s) of claim(s) 1-27 and 29 under 35 U.S.C. 102(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of 35 U.S.C. 102(e) with reference to Toklu et al. Figure 2C.
2. Re claim 29, the Applicant contends that the sequence of frames in Toklu is not from the same scene/area of interest. However, the Examiner respectfully disagrees. The new rejection below refers to Fig. 2C of Toklu wherein camera motion parameters are not taken into account, thus eliminating the influence of camera motion in key frame extraction. Additionally, Toklu discloses that several key frames may come from a single video segment (Toklu: column 6, lines 30-32).

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.
5. **Claims 1-27 and 29 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention.**

Supreme Court precedent [Diamond v. Diehr, 450 U.S. 175, 184 (1981); Parker v. Flook, 437 U.S. 584, 588 n.9 (1978); Gottschalk v. Benson, 409 U.S. 63, 70 (1972); Cochrane v. Deener, 94 U.S. 780, 787-88 (1876)] and recent Federal Circuit decisions

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[In re Bilski, 88 USPQ2d 1385 (Fed. Cir. 2008)] indicate that a statutory “process” under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example, the methods recited do not specify any physical components for carrying out each of the steps described.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1, 2, 14-17, 23, 24, and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Toklu et al. (US 6549643 B1).**

Re **claim 1**, Toklu discloses a method of identifying a plurality of key video frames in a sequence of image frames, each of said sequence of image frames containing a plurality of pixels, each of said plurality of pixels corresponding to a

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corresponding point of an area based on which said sequence of image frames are generated, said method comprising: determining a rate of change of visual content of each current frame from a corresponding reference frame, each of said current frame and said reference frame being comprised in said sequence of image frames (Toklu: Fig. 2C, step 229, smooth temporal color histogram activity curve), wherein said rate of change represents a difference of a first value and a second value, said first value representing a change of visual content of a current frame compared to a first frame, said second value representing a change of visual content of said first frame compared to a second frame, wherein said second frame is a reference frame for said first frame and said first frame is a reference frame for said current frame (Toklu: Fig. 2C, step 228; Equation 11, temporal color histogram activity curve used to generate binary color histogram activity curve); and selecting said current frame as a corresponding one of a set of potential video frames if said rate exceeds a corresponding first threshold value, wherein said plurality of key video frames are selected from said set of potential video frames (Toklu: Equation 11), wherein said determining and said selecting are repeated for each of said sequence of image frames as said current frame to form said set of potential video frames (Toklu: column 11, lines 36-38), wherein each of the respective first frame and the respective second frame are different for different ones of the current frame in said sequence of image frames (Toklu: column 11, lines 2-10).

Re **claim 2**, Tolku discloses a majority of the features of claim 2, as discussed above in claim 1, and Toklu additionally discloses determining a displacement magnitude of each moved pixel of said current frame compared to the position in said

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first frame and of said first frame compared to the position in said second frame (Toklu: Fig. 2C, step 228); and computing a first representative magnitude of said displacement magnitude for said moved pixels of said current frame compared to said first frame, and a second representative magnitude of said displacement magnitude for said moved pixels of said first frame compared to said second frame (Toklu: Fig. 2C, step 229, smooth temporal color histogram activity curve), wherein said first value and said second value respectively equal said first representative magnitude and said second representative magnitude such that said rate is computed as a difference of said first representative magnitude and said second representative magnitude (Toklu: Equation 11).

Re **claim 14**, Toklu discloses that the corresponding first frame and the corresponding second frame are selected at a same respective relative position in comparison to the position of the current frame such that each of the respective first frame and the respective second frame are different for different current frame (Toklu: column 11, lines 2-10).

Re **claim 15**, Toklu discloses that said current frame, said first frame and said second frame are in consecutive successive positions in said sequence of frames (Toklu: column 5, line 65-column 6, line 7; column 11, lines 2-10).

Re **claim 16**, arguments analogous to those presented for claim 1 are applicable to claim 16, and, therefore, claim 16 has been analyzed and rejected with respect to claim 1 above.

Claim 17 has been analyzed and rejected with respect to claim 2 above.

Re **claim 23**, arguments analogous to those presented for claim 1 are applicable to claim 23, and, therefore, claim 23 has been analyzed and rejected with respect to claim 1 above.

Claim 24 has been analyzed and rejected with respect to claim 2 above.

Re **claim 29**, Toklu discloses a method of identifying a plurality of key video frames in a sequence of image frames, each of said sequence of image frames containing a plurality of pixels, each of said plurality of pixels corresponding to a corresponding point of an area based on which said sequence of image frames are generated, said method comprising: receiving said sequence of frames of a same scene/area of interest according to a sequential order (Toklu: column 6, lines 30-32, several key frames may come from a single video segment); choosing one of said sequence of image frames as a current frame, a first flame being before said current flame and a second flame being before said first flame according to said sequential order, said first flame being at a first relative position in relation to said first flame in said sequential order and said second flame being at a second relative position in relation to said first flame in said sequential order (Toklu: column 5, line 65-column 6, line 7; column 11, lines 2-10); calculating a difference of a first value and a second value, said first value representing a measure of a change of visual content of said current flame compared to said first frame, and said second value representing a measure of a change of visual content of said first flame compared to a second frame (Toklu: Fig. 2C, steps 228 and 229; Equation 11, temporal color histogram activity curve used to generate binary color histogram activity curve); selecting said current flame as a

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corresponding one of said plurality of key video frames if said difference exceeds a first threshold value and first value exceeds a second threshold value (Toklu: column 12, lines 37-42); and repeating said calculating and said selecting after choosing each of said sequence of image frames as said current frame to form said plurality of key video frames (Toklu: column 11, lines 2-10, calculated for all frames in a segment), wherein each of the respective first frame and the respective second frame are different for different ones of the current frames, and are respectively determined based on the same first relative position and said second relative position in reference to the corresponding current frame (Toklu: column 11, lines 2-10, the process is iterative).

1. Claims 3-4, 6, 9-11, 13, 18-19, 21, 25-26, and 28 are rejected Under 35 U.S.C. 103(a) as being unpatentable over Tolku et al. (US 6549643 B1) in view of Zhang et al. (US 7027513 B2).

Re **claim 3**, Toklu discloses a majority of the features of claim 3, as discussed above in claim 2 but Toklu does not explicitly state that said first representative magnitude for said current frame equals an average of motion energy vector magnitudes of said moved pixels of said current frame in comparison with corresponding pixels of said first frame. However, Zhang discloses a method for extracting key frames from video using a triangle model of motion based on perceived motion energy, where the average magnitude of the motion vectors for a particular frame is calculated (Zhang: column 9, lines 25-38), and the average magnitude is used to calculate the perceived motion energy (Zhang: column 9, lines 39-49). Since both

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Tolku and Zhang relate to selecting key video frames based on motion analysis, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the triangle method of Zhang with the histogram analysis of Tolku in order to provide a uniform and consistent selection method that yields a proper number of key frames that are most representative of the video sequence content (Zhang: column 5, lines 34-37). The combined method of Tolku and Zhang has all of the features of claim 3.

Re **claim 4**, the combined method of Tolku and Zhang discloses a majority of the features of claim 4, as discussed above in claim 3. Additionally, Toklu discloses that said first threshold value is the same for all of said current frames (Toklu: column 12, lines 16-19, the threshold is a constant in the preferred embodiment), said selecting further comprises: including said current frame is in said set of potential video frames only if said first representative magnitude exceeds a second threshold (Toklu: Fig. 2A, step 209 eliminates substantially similar frames; column 7, lines 56-65, elimination methods are shown in Figs. 3 and 4; Fig. 4, step 405, indicates a difference threshold); and including only those of said set of potential video frames, which exceed said first threshold, in said plurality of key video frames (Toklu: Fig. 4, steps 405 and 406, if the motion is not significant, the candidate frame is eliminated).

Re **claim 6**, the combined method of Tolku and Zhang discloses identifying a plurality of active pixels in said current frame, wherein; a pixel is considered an active pixel if a corresponding displacement magnitude is outside of a range, wherein only said plurality of active pixels are used by said computing (Toklu: Fig. 2C, step 231).

Re **claim 9**, the combined method of Tolku and Zhang discloses enabling a user to specify one of a plurality of key video frames, wherein said plurality of key video frames are selected by said selecting (Zhang: Fig. 1, element 120; column 5, lines 43-44, indicate that the user may use the key frames to select the desired section of the video for display); and displaying said specified one of said plurality of key video frames (Zhang: Fig. 1, element 120; column 5, -lines 43-44, indicate that the user may use the key frames to select the desired section of the video for display).

Re **claim 10**, the combined method of Tolku and Zhang discloses displaying a prior key video frame and a next key video frame in relation to said specified one of said plurality of key video frames, wherein said prior key video frame and said next key video frame are comprised in said plurality of key video frames (Zhang: Fig. 1, element 120, key frames are displayed in a sequence).

Re **claim 11**, the combined method of Tolku and Zhang discloses generating a display indicating the manner in which said plurality of key video frames are interspersed in said sequence of image frames, wherein said enabling is based on said display (Zhang: Fig. 12, the key frames are shown along with their corresponding frame numbers).

Re **claim 13**, the combined method of Tolku and Zhang discloses generating a display listing said plurality of key video frames, wherein said enabling is based on said display (Zhang: Fig. 1, element 120; column 5, lines 43-44).

Claim 18 has been analyzed and rejected with respect to claim 3 above.

Claim 19 has been analyzed and rejected with respect to claim 4 above.

Claim 21 has been analyzed and rejected with respect to claim 6 above.

Claim 25 has been analyzed and rejected with respect to claim 3 above.

Claim 26 has been analyzed and rejected with respect to claim 4 above.

2. Claims 5, 7, 8, 20, 22, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tolku et al. (US 6549643 B1) in view of Zhang et al. (US 7027513 B2) as applied to claims 3-4, 6, 9-11, 13, 18-19, 21, 25-26, and 28 above, and further in view of Ma et al. (US 20040088723 A1).

Re **claim 5**, the combined method of Tolku and Zhang discloses a majority of the features of claim 5, as discussed above in claims 1-4, but does not specifically disclose that the first threshold and the second threshold are adjusted dynamically to ensure that a desired number of frames are selected as key video frames in a specified duration. However, Ma discloses a method for generating a video summary, where a binarization threshold is estimated in an adaptive manner (Ma: paragraph [0081]) when analyzing a video sequence for selecting key frames. Since Tolku, Zhang, and Ma relate to selecting key frames in a video sequence, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the attention modeling of Ma with the combined key frame selection method of Tolku and Zhang in order to create a representative video summary consisting of very short video clips, which contain the video immediately preceding and immediately following key frames that have been selected (Ma: Fig. 20). The combined method of Tolku, Zhang, and Ma has all of the features of claim 5.

Re **claim 7**, the combined method of Tolku, Zhang, and Ma discloses that said range set by a distance of two times the variance from the mean of a distribution (Ma: paragraphs [0081]-[0082], the threshold is a function of the variance).

Re **claim 8**, the combined method of Tolku, Zhang, and Ma discloses that said representative magnitude comprises an average of said active pixels (Ma: equation (12) and paragraph [0084]).

Claim 20 has been analyzed and rejected with respect to claim 5 above.

Claim 22 has been analyzed and rejected with respect to claim 7 above.

Claim 27 has been analyzed .and rejected with respect to claim 5 above.

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tolku et al. (US 6549643 B1) in view of Zhang et al. (US 7027513 B2) as applied to claims 3-4, 6, 9-11, 13, 18-19, 21, 25-26, and 28 above, and further in view of Sull et al. (US 20060064716 A1).

Re **claim 12**, the combined method of Tolku and Zhang discloses a majority of the features of claim 12, as discussed above in claims 1-4, 6, and 9-11, but does not specifically disclose that the display comprises a pie chart. However, Sull discloses techniques for navigating multiple video streams, where textual/visual information, such as a pie chart, may be displayed along with poster-thumbnails on the video selection screen for the user interface (Sull: paragraph [0307]). Since Tolku, Zhang, and Sull all relate to representative images for video sequences, one of ordinary skill in the art at the time of the invention would have found it obvious to combine the textual information

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of Sull with the key frame selection of the combined method of Tolku and Zhang in order to provide the user with more information, such as date and time of broadcast (Sull: paragraph [0307]), for improving the user's ability to quickly find the desired video segment (Zhang: column 5, lines 44-45). The combined method of Tolku, Zhang, and Sull has all of the features of claim 12.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:
 - a. Feature based hierarchical video segmentation; Bozdagi et al. (US 6493042 B1)
 - b. Method of selecting key-frames from a video sequence; Wilf et al. (US 7184100 B1)
 - c. System for automatic video segmentation and key frame extraction for video sequences having both sharp and gradual transitions; Zhang et al. (US 5635982 A)

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER FINDLEY whose telephone number is (571)270-1199. The examiner can normally be reached on Monday-Friday (8:30 AM-5:00 PM).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold can be reached on 571-272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Marsha D. Banks-Harold/
Supervisory Patent Examiner, Art Unit 2621

/Christopher Findley/